signals in a way that the visual representation of the first input, the second input and the third input of said means of synchronizing and combining electrical signals are presented separate from each other and each representation is not altered by the representation of the other two;

(i) comparing said visual representation of said degraded signal, said visual representation of said recovered signal, and the visual representation of said second electrical signal; and,

(j) Altering said adjustment controls of said compensation means so that the visual representation of said recovered image is modified to resembles as closely as possible the visual representation of said second electrical signal.

7. A method for evaluating degradation of an electrical signal caused by a circuit as recited in claim 5, wherein one of the plurality of visual display means recited in said placing step f, is an oscilloscope.

The above amendments of claims 5-7 provide the antecedent basis for the limitation "first electrical signal", are supported by the specification and contain no new matter. Therefore, these amendments overcome the rejection under 35 U.S.C. 112, second paragraph.

2. In the Office action dated 9-2-99, the Examiner rejected claims 1-15 under 35 U.S.C. 103(a) as being unpatentable over Wolf, (U.S. Pat # 5,596,364), in view of Nicholas, (U.S. Pat # 4,677,481). Applicant hereby presents the following argument:

I. THE WOLF PATENT TEACHES AWAY FROM THE INSTANT INVENTION

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It is well established that a *prima facie* case of obviousness may be rebutted by showing that the reference, in any material respect, teaches away from the claimed invention (In re Geisler, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1355 (Fed.Cir. 1977). Here, the Wolf patent teaches away from the instant invention for the following reasons:

1. The Wolf patent is apparently directed to a means for measuring the quality of the Transmission Channel 3 by comparing the perceptual degradation of a signal transmitted from the Source Video 1 to the Destination Video 5 via the Transmission Channel 3. In order to accomplish subjective testing of the perceptual degradation, the Wolf patent teaches the use of the Impairment Generator 37 to simulate the degradation that "might occur" when the signal is transmitted from the Source Video 1 to the Destination Video 5 via the Transmission Channel 3. Specifically, the Wolf Specification, on page 6, lines 44 – 51, states as follows:

> "The source video 1 from the library of tests scenes 36 is input to the impairment generators 37. The impairment generators 37 generate an impaired destination video 5' that includes impairments that spun the entire range and types of impairment that can arise from the variety of transmission channels 3 that could be incorporated into the system of the present invention."

It is clear that Wolf teaches simulation of degradation that does not represent the actual degradation caused by Transmission Channel 3. In contrast to Wolf, rather than simulating the degradation that "might occur" in the system by employing an "impairment generator", the instant invention teaches testing the actual system by passing a signal

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through the system and thus measuring the degradation caused by the actual system being tested. It appears therefore that Wolf teaches away from the instant invention by subjectively comparing Source Signal 1 to Destination Video 5' which is simulated by the Impairment Generator 37 as opposed to measuring the actual degradation caused by the system itself.

2. The Wolf patent teaches analog to digital conversion of the video signal in order to practice his invention. Specifically, Source Instrument 6 and Destination Instrument 12 can only work with signals converted to digital format. To this end, Wolf uses Video Format Converter 18 and Video Format Converter 26 to convert Source Video 1 and Destination Video 5 to digital format. It is well known that conversion of analog high resolution video signals (such as signals generated by a computer) from analog to digital format produces degradation in its own right. Specifically, conversion will result in pixel loss and resolution degradation of the video signal. In addition, analog to digital conversion process of high resolution video signals produces unstable images with pixel jitter artifacts. This is especially true with resolution exceeding 1024x768. This problem is clearly manifested in LCD (Liquid Crystal Display) projectors currently in production. In these projectors analog high resolution video signal (VGA) is converted to digital format before it is displayed on the screen. The typical artifact is jittery pixels. Therefore, the Wolf patent cannot be used for testing analog high resolution video signals with resolutions above 1024x768. Thus, with respect to high resolution video signals, the Wolf patent teaches degradation of the signal which is not related to the degradation caused by the transmission channel. This clearly defeats the purpose of the present invention.

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In addition, the analog to digital conversion is not sensitive enough to properly reflect subtle degradation of the video signal as it passes through Transmission Channel. In this case, the comparison of the digitized Source Video 1 and digitized Destination Video 5 signals may not yield any measurable difference even though the Destination Video 5 may have degraded. In contrast, the instant invention maintains video signals in its original form and allows to detect slightest amount of signal degradation due to passing through transmission channel. Therefore the Wolf patent teach away from the instant invention by requiring analog to digital conversion of the Source Video 1 and Destination Video 5.

In sum, the Wolf patent cannot be used as a reference because it teaches away from the instant invention by employing an "impairment generator". It also teaches away by employing analog to digital conversion of analog video signals, which makes it impossible the practice of the Wolf patent with respect to high resolution (computer-generated) analog video signals. Therefore, claims 1-15 should be allowed.

II. THE SUBJECT MATTER OF THE OFFICIAL NOTICE TAKEN BY THE EXAMINER DOES NOT PROVIDE BASIS FOR REJECTION

The Examiner has taken an Official Notice that at the time of the invention it was well known in the art to include a variety of adjustment control functions on waveform monitors, which enable the user to change an array of visual display characteristics of a video signal, such as amplitude, frequency sweep, focus, etc. Applicant does not disagree with the subject matter of the Official Notice. Clearly, computer monitors and

the like are equipped with numerous adjustment controls, such as brightness, color, geometry, size, etc. However, Applicant respectfully disagrees with the Examiner's argument that said subject matter, when combined with the references, provides basis for rejection. Specifically, adjustment control functions on a monitor alter the way video signals are displayed on the monitor. These controls do not, however, alter the video signals themselves. For example, manipulating a brightness control on a computer monitor will change the brightness of the display without affecting the characteristics of the video signal coming to the monitor. That means that degraded video signal will still be displayed as degraded video signal when brightness or any other display controls are adjusted. By the same token, if two signals are simultaneously displayed on one monitor, manipulating brightness control on the monitor will change brightness with respect to both displayed signals. It will not allow to compensate one signal for degradation, while using the other signal as a reference. In contrast, the instant invention provides compensation means that affect the signals themselves and allows to compensate for degradation while leaving the reference signal unchanged.

Therefore, in addition to the Wolf patent being unavailable as a reference, claims 5, 6, 8 and 15 cannot be rejected on the basis of combining the Wolf patent with the subject matter of the above Official Notice.

III. THE COMBINATION OF WOLF AND NICHOLAS FAILS TO ESTABLISH A *PRIMA FACIE* CASE OF OBVIOUSNESS BECAUSE IT DOES NOT TEACH ALL CLAIM LIMITATIONS OF THE INSTANT INVENTION

In order to establish a *prima facie* case of obviousness of the instant invention, all the claimed limitations must be taught or suggested by the combination of the Wolf and Nicholas patents. (In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). Here, as the discussion below will show, the combination of the Wolf and Nicholas patents does not teach or suggest all claim limitations of the instant invention.

If Wolf and Nicholas are combined, presumably Source Video 1 and Impaired Destination Video 5' of Wolf would be connected to CH-A and CH-B of Nicholas (see Fig. 1 of Nicholas and Fig. 3 of Wolf). This would allow the "large panel of viewers" to view and compare Source Video 1 and Impaired Destination Video 5' displayed simultaneously side-by-side on one monitor. Since Impaired Destination Video 5' comes from the Impairment Generator 37, the "large panel of viewers" does not see the signals degraded due to passing through the Transmission Channel 3. Accordingly, such viewing has nothing to do with testing how the Transmission Channel 3 degrades the signals that pass through it. Instead, the "large panel of viewers" uses a scoring system to generate statistical data (Viewing Panel Results 40, see Fig. 3 and Fig. 5 of Wolf). The purpose of this exercise is to "provide a method of video quality that agrees closely with the perceptual video quality obtained from a large panel of human viewers". (See page 3, lines 29-32 of Wolf). Simply put, the purpose of the viewing of Source Video 1 and Impaired Destination Video 5' is to interject human element into the Statistical

Analysis 41 so that the Quality Analysis 43 "agrees closely" with how a "large panel of human viewers" perceives quality of video signals.

In contrast, the instant invention contains the following crucial and necessary limitation:

"(b) passing said first electrical signal through the circuit thereby causing the circuit to output a degraded electrical signal;"

In terms of the Wolf patent, Impaired Destination Video 5' would have to pass through the Transmission Channel 3 before viewing by a "large panel of human viewers" in order to teach or suggest the above limitation of the instant invention. However, the limitation of "passing said first electrical signal through the circuit thereby causing the circuit to output a degraded electrical signal" does not appear anywhere in the combination of Wolf and Nicholas. Therefore, said combination of references does not establish a *prima facie* case of obviousness.

3. In the Office action dated 9-2-99, the Examiner cited certain pertinent prior art that was not relied upon in rejection of claims 1-15. The following is a brief discussion of why the cited prior art should not affect the patentability of claims 1-15:

A) Kafer: employs "test patterns" which according to the Wolf patent "do not work".

B) Judge, Bartelink, Parsons, Efron, Stoker: cannot be used for testing analog high resolution signals; require close proximity between the input and output.

C) Inoue: Limited to adjusting physical location of the projected image on different portion of the screen. Does not affect the signal itself, nor compensates for degradation.

D) Maycock: cannot be used for analog high resolution signals, cannot be used for displaying two images on a single monitor.

E) Thoma: Limited to adjusting the display. Does not affect the signal itself, nor compensates for degradation.

CONCLUSION

In view of the foregoing, it is believed that Claims 1-15 now pending are in condition for allowance. Allowance of Claims 1-15 is respectfully requested.

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Respectfully submitted,

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